clare whether a storm belongs to the intermittent or the regular types. Confusion would be the only result.

A few statements by Pernter[7] are worthy of notice. He says:

It was by this means demonstrated that there is an extraordinarily great variety of forms of atmospheric pressure distribution; that these, however, can be classified into a certain number of types by having regard to the form as well as to the weather conditions given in these forms. * * *

The knowledge of the weather conditions for every place and for every type of pressure distribution offers the only entirely satisfactory empirical basis for weather predictions; moreover, it is by this knowledge alone that we can hope at some time to discover the fundamental laws of the changes in the weather.

Pernter would be correct if ideal conditions prevailed. If one must depend upon types, he will have to wait a long time to discover the "fundamental laws of the changes in the weather." Had Pernter used the expression "variation of pressure distribution," instead of "type of pressure distribution," then his statement would be true; but presence of a "type" assumes the existence of types, which is the problem to be solved first.

In the United States Weather Bureau leaflet, above referred to as "Explanation of the Weather Map," the following statement is made, accompanying the chart of "mean tracks and average daily movement of storms in the United States:"

The first impression of a student of the weather maps, as they present their seemingly endless forms and combinations of the temperature and pressure lines, is often one of confusion.

The storms of the United States follow, however, year after year, a series of tracks, not capricious, but related to each other by very well defined laws.

Then, after a detailed account of various possibilities of paths which a storm might assume in crossing the continent, a statement is wisely added, which, however, defeats the hypothesis of type paths:

The chief difficulty in the art of forecasting is to decide which of these paths will be pursued and the probable rate at which the movement will take place.

This is the problem exactly, "which paths will be pursued and the probable rate of movement." If we had a type, we should certainly know the path which a storm would pursue and the exact conditions attending it at every point; but we know by experience, an experience consisting primarily in failures of forecasts, that a storm very often does not follow an expected path nor does it bring about hoped-for conditions, but quite often does just the reverse of what is forecast; sometimes it remains stationary for several days; at times it becomes intensified and moves on with great velocity; again it weakens and moves more slowly; often it apparently splits in two or dissipates entirely.

The eccentricities of storms are well illustrated by many sets of weather maps. Those for the period of November 28 to December 3, 1907, show very nicely the irregular movements of storm areas—the stationary high in the West, a series of swiftly moving lows about the high and of course moving from west to east, a local development of a low in the Mississippi Valley and the movement of the high in the West after having been stationary for six days.

This series of maps and forecasts shows that even the expert forecaster may often be completely at sea, and that it must be misleading to say that—

By preserving the weather charts each day and noting the movements of the highs and the lows any intelligent person can make an accurate forecast for himself, always remembering that the lows as they drift toward him from the west bring warm weather and sometimes rain or snow, and that as they pass his place of observation the highs following in the tracks of the lows will bring cooler and probably fair weather.[8]

If the distinguished author means that a truly accurate forecast can be made so easily as this, the statement is quite optimistic. It does not require a great deal of study to convince one that under present conditions it is no easy task to forecast with accuracy. The writer here quoted has probably forgotten that it is his long experience which makes forecasting seem easy.

Considering then:

1. What a type storm is;
2. The number of apparent types;
3. The lack of ideal conditions;
4. The presence of local influences;
5. The results of experience in forecasting;

I feel thoroly convinced that there is no type storm; that the type storm as a basis for forecasting must be discarded if we hope ever to arrive at an era of accurate forecasting; that a more thoro study of local influences must be made.

THE PRESENT AND FUTURE STATE OF MARITIME METEOROLOGY.

By H. HERGESELL, Director of the Meteorological Service of Alsace-Lorraine.

[Translated from the German version in Gaea, August, 1906, p. 480-486.]

By the term "maritime meteorology" I understand the science that has to do with the processes occurring in that part of the atmosphere lying over the sea. The distinction between the oceanic and continental portions of the atmosphere is not only logical but also requisite, for the reason that most meteorological processes are conditioned not merely by direct solar radiation, but also by the thermal interrelations of the atmosphere with the liquid or solid surface of the earth.

The earth's surface exercises so great an influence on the diurnal variation of temperature, the distribution of water vapor, and the occurrence of convectional currents that we can understand these phenomena only by taking into account the sources of heat which this surface offers. As to its thermal action, the surface of the sea is essentially different from that of the land. The land surface receives a certain quantity of heat during the day, and loses it again at night by radiation, so that a rapid alternation takes place and the heat does not penetrate deep into the ground. The solar rays are less readily absorbed by the water surface than by the land, but they penetrate deeper. For this reason, and also on account of the difference in specific heats, the temperature of the water changes less than that of the land, altho the quantity of heat absorbed is decidedly greater. Moreover, the surface temperature of the sea water falls but little, relatively, at night, since the water, as it cools, is immediately replaced by warmer water from the lower strata. This essential difference in behavior between sea and land fully justifies the distinction between maritime and continental meteorology. While our knowledge of the latter has made great progress, our knowledge of the former has made but little; a fact easily explained by the difference in the conditions of observation. Over the land surfaces whereon we dwell, and particularly in civilized countries, meteorological studies are easily carried on; they are, in fact, to a certain extent forced upon us. We have known for a long time, and with considerable accuracy, the laws which govern meteorological processes over dry land; tho, to be sure, our modern methods of investigation have been arrived at but gradually. We began with observations at the earth's surface, then erected mountain observatories, and finally penetrated to the upper, free atmosphere, with the help of kites and balloons.

In the domain of maritime meteorology work has been much less active. Its history is bound up with that of the great oceanographic expeditions, among which the *Challenger* expedition, the scientific voyages of the Prince of Monaco, and the cruises of the *Gazelle* and the *Valdivia* take first rank. The meteorological investigations which these expeditions carried on were, moreover, limited to the lower strata of the atmosphere; only very recently, thanks to the initiative of the Prince of Monaco, has the study of the upper air been taken in hand. We should not, therefore, be surprised that our

[7] Monthly Weather Review, December, 1903, vol. xxxi, p. 579, 580.
[8] Nat. Geog. Mag., March, 1907.

knowledge of maritime meteorology still shows great gaps, and above all in regard to the fundamental phenomena of the atmospheric circulation. If a certain stagnation in meteorology was to be observed a few years back, it is to be ascribed to just these gaps, the great importance of which a glance at the map will readily show.

The meteorology of the land relates to four-tenths of the earth's surface, the other six-tenths of its surface being covered by the sea. Hence, we must feel all the more indebted to the Prince of Monaco for having been the first to undertake the study of the upper air strata over the sea. Over the sea as well as over the land it is the upper regions of the free atmosphere whose study is the most important, since it is there that the great currents of the general circulation have their origin, which carry the air from the equator to the poles and back to the equator. I will first say a word regarding the great problems of the general circulation of the atmosphere—problems the study of which we have already begun with the first ascensions from the *Princess Alice*.

It is indubitable that the heating effect of the sun reaches its maximum at the equator. There the air, warmed by solar radiation, rises to great heights, whereby it loses a greater or less part of its aqueous vapor, and then flows off above toward the poles. The air lying to the north and south flows in to restore the equilibrium of the atmosphere, and thus arise the air currents known as "trade winds." In our expedition of last year (1905) we studied the mechanism of this circulation in its general features, and have published our results. The second problem, no less important, relates to the method and means whereby the movement of the ascending air in the vicinity of the equator is accomplished, and the directions taken by this mass of air in the upper strata. The ascending movement takes place probably in the regions of calms in the vicinity of the equator, and can only be studied with the aid of kites, or still better, in view of the relative sluggishness of the air, with sounding balloons. According to the reports of many observers, the air in the region of the equatorial calms is often cloudless, and only sounding balloons can give trustworthy indications of the direction of the air currents in the upper regions of the atmosphere.

The experiments that were carried on over the Mediterranean in April, 1905, have proven that such ascents of sounding balloons are quite easily made. In fact, in the light of the experiments already made, we may conclude that under favorable circumstances it will be possible to observe with these balloons up to altitudes of 14,000 meters and over. The summer and the early autumn are the most favorable seasons for experiments of this kind in the equatorial regions, for then the calm belt extends far to the north and can be reached even with a vessel having but a limited radius of action.

From the study of the calm belt at the equatorial limit of the trade wind we naturally proceed to a study of the region of calms north of the trade wind; i. e., the region of high pressure and feeble air movement that we meet with at about 35° latitude. Here again we must make use of kites and sounding balloons, and we must make every effort to raise the latter to the greatest possible altitudes. For the question is to determine whether there exists a closed circulation of air between the equator and the regions of calms lying north and south of the Tropics, or whether the general circulation of the atmosphere also embraces the circumpolar and polar regions.

Ascents of sounding balloons over the land have proven the existence of a warm stratum of air at an altitude of about 11 kilometers. At that altitude the decrease of temperature with ascent ceases more or less abruptly, to be succeeded by a rise of temperature at higher altitudes for several kilometers upward. This zone of temperature inversion with altitude probably bears some intimate relation to the general circulation, and it appears to be a matter of great importance to determine its exact situation over the sea. Such investigations require the use of sounding balloons, and our experiments have shown that this is practicable under certain conditions. We might also employ a mixt method, which, theoretically at least, holds out prospects of the most complete success. In this method a theodolite must be set up on land (on some island), and with it the flight of the balloon may be followed until it has reached the earth. By measurements of the apparent (i. e., angular) altitude and azimuth of the balloon, together with its vertical velocity, the place of its descent could be determined with sufficient accuracy to enable the ship to find it. This method of sighting has been employed repeatedly at Strassburg, and has given satisfactory results. On the sea its success would be even more probable, for the ship could follow the balloon from the beginning of its ascent, and be kept informed of the direction of its flight by means of wireless telegraphy. The ascent of a sounding balloon to 15 or 16 kilometers altitude and its subsequent descent requires only about ninety minutes, so that the horizontal distance attained in its flight can never be very considerable. By such means the important stratum of the temperature inversion (the "inversion zone") might be studied very successfully in all latitudes. Morever the method of "sighting" the balloons by means of theodolites which we have just explained would enable us to determine with accuracy the direction and velocity of the air currents at every altitude. By this means the great problems of the atmospheric circulation could be solved; for the self-registering instruments of the sounding balloons show the temperature and humidity of all the air strata thru which they pass. A single successful ascent of this kind would, at the present time, possess the highest scientific value.

I now turn to the investigations that will need to be carried out in the polar regions, and that are no less important than the work in the region of calms, for here, also, we have to do with the important question of the general circulation.

According to the observations in the lower strata of the atmosphere there appears to be a general movement of the air toward the lower latitudes (i. e., equatorward). We have grounds, however, for assuming that a contrary condition of things prevails in the upper regions of the atmosphere. Kite and balloon observations are called on to throw new light on the circulation at these altitudes. It would be of still greater interest, however, to get temperature readings from the various strata up to the upper limit of the inversion zone, since its altitude must stand in intimate relation with the general circulation of air between equator and pole. If we find that this upper inversion zone exists in the polar regions—and I have no doubt that we shall[1]—then the simple determination of its height above the ground would give the solution of a whole series of problems in the mechanics of the atmosphere. The ascensions of sounding balloons that have been made at St. Petersburg justify the suspicion that the relatively warm upper layer of air [the isothermal zone or inversion stratum] will be found at altitudes in the atmosphere lower under high latitudes than at lower latitudes. The exact determination of these altitudes should constitute one of the principal aims of maritime meteorology.

Aside from these more general questions there are a great many problems peculiar to maritime meteorology that have a more local character. First of all, I would mention the study of certain peculiar winds, especially the monsoons. These convectional currents with annual period arise on nearly all continental coasts in tropical regions, and are due to the differences in temperature [of the air] over the land and sea. We are here concerned with determining their altitudes and

[1] This prediction has been justified by the results of the balloon observations at Kiruna, Lapland, taken in 1907 under the direction of Teisserenc de Bort—*C. F. T.*

the times at which the movements begin at the different levels of the atmosphere. Such studies may lay claim to great practical as well as scientific interest, for every one knows how important a rôle is played by the monsoons and their attendant phenomena in the welfare of the inhabitants of India. Furthermore, the study of the monsoons of the Indian Ocean is intimately connected with that of the trade winds in the same region, for the northeast monsoon, which blows in winter, is nothing else than the regular trade.

In the neighborhood of the Canary Islands we meet with land and sea breezes having the character of foehns. Similar winds must occur on all coasts, and it would be productive of interesting results to study these phenomena with the aid of kites. In this connection should also be mentioned the mistral and the sirocco of the Mediterranean and the bora of the Adriatic.

Besides these special problems, which are exceedingly numerous in maritime meteorology, it is important to undertake the study of the atmosphere over the sea from a general point of view, and to make such investigations as frequently as possible. The great questions as to the circulation of the air in cyclones and anticyclones, the formation of these areas of low and high pressure, their transformations and movements of translation must be studied on the sea just as on the land. Especially will the study of isobaric surfaces over the ocean lead us directly to a knowledge of the mechanical conditions of their existence, for the principal source of complication in this problem—viz, the effect of the very irregular surface of the earth—is lacking over the ocean.

The use of sounding balloons is to be recommended for investigations of this sort, and the vicinity of the Azores may be pointed out as especially suitable for the purpose. Here we find ourselves within one of what Teisserenc de Bort and Hildebrandsson have named the "action centers" of the atmosphere. In the neighborhood of the Azores we often meet with small depressions, which originate in the vicinity of these islands, and, as they deepen, move off to the westward. The study of the development and progress of these small depressions would be very instructive.

There is one final point that I wish to refer to. We know that the temperature of ocean currents has a considerable influence on the temperature of the air over them. In proof of this we may refer to the isothermal charts of Norway, in which the isotherms are seen to be pushed far to the north in consequence of the influence of the Gulf Stream.[2] It would be of great interest to know to what height in the atmosphere this influence makes itself felt. A few kite ascensions would suffice to throw light upon this question. Furthermore, similar influences are met with not only in Norway, but also, for example, on the west coast of Africa, where cold water from the depths of the ocean comes to the surface and lowers the temperature of the air.

It is not possible to discuss here in detail all the questions in maritime meteorology that ought to be studied; my object will have been attained if I have made clear the importance of the problems that I have mentioned. The reader can not fail to observe that among these problems there are some that will require for their investigation a rather long period of time. Such investigations can hardly be undertaken except by the navies of the different countries and the great companies of the merchant marine. In this connection I may state with pleasure and gratitude that His Highness the Prince of Monaco has succeeded in awakening in his Majesty the German Emperor an interest in these questions, and that the cooperation of the German navy appears to be assured. Moreover I am happy to announce that several large German marine companies have exprest a wish to take part in these important investigations. Yet, however important and desirable all this cooperation may be, the fact should be emphasized that a certain number of problems above referred to can be solved only after very special preparations have been made. A swift vessel is indispensable, and one that will lay its course entirely in accordance with the exigencies of the problem in hand, and that has, moreover, an equipment specially adapted to the work. All these desiderata can only be realized in a regularly organized expedition, having for its sole object investigations in maritime meteorology; and the history of modern science permits us to hope that such an undertaking will actually come about. The great civilized nations have expended millions to probe the mysteries of the poles; but the problems that await solution in the ice-cold regions of the upper air are no less important than those hidden beneath the polar ice. There can be no doubt that a voyage around the world having for its sole task the unriddling of the still unexplored mysteries of the upper atmosphere would achieve as much success and applause in the scientific world as the exploration of the unknown regions of the poles.

[2] The drift of the surface waters due to the southwest winds of this region is sometimes erroneously spoken of as an extension of the Gulf Stream.—*C. A.*

The above paper was originally published in 1905 in the Bulletin du Musée Océanographique de Monaco, No. 44. The original (in French) not being at hand, the foregoing translation has been made from a German version published in Gaea, 42. Jahrgang, August, 1906.

The desiderata set forth above are being rapidly fulfilled. Doctor Hergesell's earlier expeditions on the *Princess Alice*, on the Mediterranean and the Atlantic, were made in 1904 and 1905. In 1906 he made observations over the Arctic Ocean. Most noteworthy among the achievements of 1906 was the expedition sent out by Messrs. Rotch and Teisserenc de Bort, on the *Otaria*, which proved the existence of the return-trades; i. e., winds having a poleward component blowing above the level of the trade winds. The latter were found to have an average depth of only 1,000 meters, and the return-trades were encountered at a height of from 1,800 to 3,000 meters. The same expedition revealed the fact that the temperature at great heights above the thermal equator is lower than it is at the same heights in temperate regions, owing to the absence of an "isothermal zone." In 1906, also, the survey-ship *Planet*, of the German Navy, sailed from Kiel on a long voyage to the South Seas, in the course of which she made a series of upper-air observations over the Atlantic, Indian, and Pacific oceans. Several successful kite observations were made by Doctor Linke in Samoa.

In the summer of 1907 occurred the first "international week" of simultaneous ascents of kites and balloons in all parts of the world (July 22–27). In addition to a great number of observations at land stations, the French cruiser *Forbin* observed with sounding balloons in the neighborhood of the Azores; the Italian man-of-war *Fulmine*, having on board Doctor Palazzo, director of the Italian meteorological service, made observations over the Mediterranean; Russian vessels observed over the Gulf of Finland and the China Sea; the German Navy participated with two vessels—the *Planet*, in the South Pacific, and the *Möwe*, in the Atlantic between Iceland and Norway; a private expedition under Hewald and Hildebrandt made ascents between Iceland and the British Isles; the *Otaria* was again at work in the vicinity of the Azores; and Doctor Hergesell himself accompanied yet another expedition of H. H. the Prince of Monaco, which carried on observations in Spitzbergen.

Another "international week" is planned for the summer of 1908. This time it is intended to concentrate all efforts upon the equatorial regions, which will be covered by as many ascents as possible both by land and by sea. The German Navy has planned ascents off the west coast of Africa and in the Pacific Ocean north of the equator, and there is a prospect that the French Navy will carry on work in the French West Indies. Other maritime nations, including the United States, have been invited to join in this important campaign. This international ocean work offers a fine opportunity for wealthy American owners of fine pleasure yachts to devote a little attention to the study of the atmosphere over the ocean.—*C. F. T.*

ABSTRACTS OF RUSSIAN METEOROLOGICAL MEMOIRS.

By Prof. ALEXANDER VOEIKOV. Dated St. Petersburg, December, 1907.

As the Travaux du Cabinet de Geógraphie Physique de l'Université Imperial de St. Petersburg, premier fascicule (Work of the Department of Physical Geography of the Imperial University of St. Petersburg) is out of print, I give herewith a short abstract of the articles therein; following this is a summary of a recent article by Chipchinskii and a note by myself.

I. *Temperature and precipitation of eastern Siberia. 32 pp. Ivitskii.*

I have given an abstract of these temperatures in Meteorologische Zeitschrift, 1900, p. 116, to which I here refer, and give now only a table of precipitation. (See Table 1.)

Everywhere, except in Kamtchatka, the west shore of the Sea of Okhotsk, and Sakhalin, the summer rains predominate enormously. In the two latter regions the rains of the monsoon of eastern Asia come but a little later, as in July the sea is yet too cold to yield much vapor. The same is partly the case in Vladivostok and St. Olga. Kamtchatka is entirely out of the region of the monsoon, and Petropavlosky has about the climate of northern Newfoundland, being very humid and rich in rain or snow during the whole year. The first six places of the table are in the region of the Asiatic anticyclone of winter, when calms largely prevail. Besides, the winter is so cold here that heavy precipitation is impossible. In summer the temperature is high for the latitude, vapor of water is abundant, and frequent cyclones are favorable to precipitation. So here also summer rains prevail enormously, tho the country is out of the region of the Asiatic monsoon, which only reaches to about 60° north latitude on the west shore of the Sea of Okhotsk.

TABLE 1.—*Precipitation in eastern Siberia.*

N. latitude.	E. longitude.	Height.	Name.*	Spring.	Summer.	Fall.	Winter.	Year.	Maximum. Amount.	Maximum. Month.
°	°	Met's		mm.	mm.	mm.	mm.	mm.	mm.	
62.0	129.7	100	Yakutsk	38	144	63	29	273	56	VIII
53.2	114.3	537	Blagovestchensk Priisk	51	146	81	51	329	57	VII
52.3	104.3	491	Irkutsk	56	192	75	46	369	73	VII
51.8	107.6	521	Verkhneudinsk	21	130	32	13	196	68	VII
50.4	106.4	782	Kiakhta	27	186	42	8	264	82	VII
51.3	119.6	657	Nerchinski Zavod	48	285	69	8	409	110	VIII
50.2	127.6	110	Blagovestchensk	84	327	101	4	515	136	VIII
48.5	135.1	77	Khabarovsk	107	262	105	25	499	140	VIII
52.4	134.1	915	Sofiiski Priisk	53	388	109	13	563	164	VII
53.1	140.7	35	Nicolaievsk	87	174	141	49	451	80	VIII
56.5	138.3	10	Ajan †	74	471	368	43	957	234	VIII
56.5	158.8	16	Petropavlovskii Kamtchatka	314	189	399	292	1193	170	XI
50.8	142.1	7	Alexandrovskii, Sakhalin	89	193	227	90	599	98	IX
50.8	142.9	125	Rykovskoye, Sakhalin	80	215	197	58	557	96	IX
46.6	148.8	26	Karsakovsky Post, Sakhalin	90	149	132	48	420	66	IX
43.7	135.3	45	St. Olga	160	379	270	60	859	190	VIII
43.1	131.9	17	Vladivostok	69	202	122	13	408	96	VIII

* The spellings of the atlases of the Encyclopedia Britannica and the Century Dictionary are adopted.
† At or near sea shore.

II. *Climate of Batum. 17 pp. Moskalskii.*

The following table gives the principal elements of the climate of Batum: (latitude 41.5° N. longitude 41.5° E.).

TABLE 2.

	Mean temperature.	Relative humidity.	Amount of cloud.	Precipitation. Amount.	Precipitation. No. of days with 40mm. or more.
	(1) °C.	(2) %	(3) Tenths.	mm.	(4)
I	6.3	76	5.6	251	1.2
II	5.9	79	6.1	188	0.8
III	8.3	81	6.5	154	0.4
IV	11.1	82	6.2	128	0.3
V	15.7	83	6.0	72	0.1
VI	20.3	81	4.7	143	0.1
VII	23.1	80	5.2	154	1.1
VIII	23.7	81	5.2	226	2.4
IX	20.4	82	4.7	314	2.6
X	17.0	81	4.2	205	2.1
XI	12.2	81	5.5	321	2.9
XII	9.6	75	5.5	253	1.7
Year	14.5	80	5.2	2408	16.4

(1) 15 years 1882–1896. Mean of observation at 7, 13, and 21 hours.
(2) 13 years 1884–1896. Same hours.
(3) 15 years 1882–86. Same hours.
(4) 15 years 1882–86.
The greatest quantity of rain in one day was 261 mm. in August, 1882.

The humidity of the air is great, especially in the warmer months, the rains very heavy, by far the heaviest of all on the shores of the Mediterranean and the seas opening into it. The contrast is very great with eastern trans-Caucasia and the shores of the Mediterranean where the summer is nearly rainless. Great quantities on one day are frequent at Batum, and these heavy rains often fall at night, without thunder and lightning, and with high barometric pressure. Especially is this the case from August to November. The high temperature, great humidity of the air, and abundant rains are favorable to a rank plant growth. In this respect the vegetation resembles that of the dampest parts of the Tropics, but the genera of plants are the same as in central Europe. The air is dryest in winter, when land winds predominate somewhat.

III. *The winds of Batum. Novitskii.*

The mountainous country around the city of Batum deflects the winds from their original course, and is thus unfavorable to a consideration of the relation of barometric gradients to winds. The sea winds are more frequent in the spring and summer, the land winds in winter. At all seasons, with partial exception of winter, there is a very marked daily period in the winds. In the middle of the day they come mostly from the sea; calms are not frequent, they predominate at the hours 7 and 21 local meridian time. Observations in the middle of the night would have shown a greater percentage of land winds than at these two hours.

TABLE 3.—*Percentage of winds at Batum.*

FOR FIFTEEN YEARS, 1882–1896.

	N.	NE.	E.	SE.	S.	SW.	W.	NW.	Calms.
Spring	7.3	5.0	13.3	7.5	7.6	23.9	5.4	8.5	16.1
Summer	4.1	2.1	13.7	6.2	8.1	25.6	10.1	11.6	18.3
Fall	6.1	6.2	15.7	9.5	11.1	16.6	7.6	6.1	13.1
Winter	6.3	8.4	22.5	14.4	10.3	19.9	3.5	3.8	13.9
FOR 7 A. M., 2 P. M., AND 9 P. M. FOR TWO YEARS, 1895–96.									
Seven hours	2.1	8.5	8.4	5.9	5.9	11.3	2.1	1.7	5.4
Thirteen hours	7.6	2.8	1.8	4.2	5.1	19.7	19.9	24.8	14.1
Twenty-one hours	1.5	2.2	4.5	4.5	3.5	11.1	2.8	0.7	69.2

The land winds, when strong, have the character of foehns; they bring a very high temperature (up to over 28° C.) in March and October and over 25° in December and a great dryness of the air, which are in great contrast to the moderate temperature and great humidity generally experienced. When such winds continue two to three days without intermission the vegetation suffers greatly. I give the following examples of foehn days: